

CLAIMS

1. A deposition system for generating airborne fine particles containing a thin film-forming component to attach the airborne fine particles to a substrate, comprising a rotary porous filter plate, including a disk having a large number of perforations extending therethrough, rotated on a rotary shaft connected to the center of the disk at high speed, wherein the rotary porous filter plate is disposed between the substrate and a target such that the fine particles flying through the perforations are deposited on the substrate but the fine particles which fly low speed and which are transformed into droplets are trapped in the perforations.

2. The deposition system according to Claim 1, wherein the sum of the areas of portions of the perforations is 80% or more of the surface area of the rotary porous filter plate, the portions thereof being located at faces of the rotary porous filter plate.

3. The deposition system according to Claim 1, wherein the perforations each have end portions and an intermediate portion having a diameter greater than those of the end portions, the end portions being located close to surface regions of the rotary porous filter plate.

4. The deposition system according to Claim 1, wherein portions of the perforations that are located at a face of

the rotary porous filter plate on which the fine particles are incident has a diameter greater than that of portions thereof that are located at a face of the rotary porous filter plate from which the fine particles are released.

5. The deposition system according to Claim 1, wherein the perforations close to the edge of the filter plate have diameters greater than those of the perforations far from the edge thereof such that the fine particles flying at low speed can be uniformly trapped over a face of the rotary porous filter.

6. The deposition system according to Claim 1, wherein the center lines of the perforations are parallel to the rotary shaft of the rotary porous filter plate.

7. The deposition system according to Claim 6, wherein portions of each perforation that are located at faces of the rotary porous filter plate are circular and the maximum speed (in mm/second) of the fine particles that can be trapped by the rotary porous filter plate is given by the equation $V_{\max} = (1 / 2)h\omega / \tan^{-1}(X / 2R)$, wherein V_{\max} represents the maximum speed thereof, X represents the diameter of the portions thereof, R represents the distance between the center line of the rotary shaft of the rotary porous filter plate and the center line of the perforation, h represents the length (in mm) of the perforation extending in the rotary porous filter plate in the flight direction of the fine particles, and ω represents the angular speed (in

radians/second) of the rotation of the rotary porous filter plate.

8. The deposition system according to Claim 1, wherein the center lines of the perforations are diagonal to the rotary shaft of the rotary porous filter plate.

9. The deposition system according to Claim 8, wherein the minimum speed and maximum speed of the fine particles that can pass through the perforations are given by the equations $V_{min} = (1 / 2)h\omega / \tan^{-1}((2X + d) / 2R)$ and $V_{max} = (1 / 2)h\omega / \tan^{-1}(d / 2R)$, respectively, wherein V_{min} represents the minimum speed thereof, V_{max} represents the maximum speed thereof, h represents the length (in mm) of each perforation extending in the rotary porous filter plate in the flight direction of the fine particles; ω represents the angular speed (in radians/second) of the rotation of the rotary porous filter plate; R represents the distance between the center line of the perforation and the center line of the rotary shaft connected to a face of the rotary porous filter plate that faces the target; X represents the maximum size obtained by measuring the shape of the perforation in the circumferential direction of the filter plate, the shape being exposed at the rotary porous filter plate face facing the target; and d represents the deviation of the perforation, extending diagonally from a face of the rotary porous filter plate on which the fine particles are incident in the reverse rotation direction, in the plane of

projection.

10. The deposition system according to Claim 1, wherein the center lines of the perforation are tilted in the circumferential direction of the rotary porous filter plate.

11. The deposition system according to Claim 1, wherein the perforations are formed in the disk made of metal by etching.

12. The deposition system according to Claim 1, wherein the perforations are formed by laminating a plurality of disks having through-holes with different diameters.

13. A deposition method using the system according to any one of Claims 1 to 12.

14. The deposition method according to Claim 13, wherein fine particle-trapping properties of regions of faces of the rotary porous filter plate are adjusted on the basis of the diameter and shape of the perforations.

15. The deposition method according to Claim 13 or 14, wherein the fine particles flying at a speed greater than the maximum speed of the fine particles that can pass through the perforations and the fine particles flying at a speed less than the minimum speed of the fine particles that can pass through the perforations can be both trapped, the maximum and minimum speeds being set for each perforation.

16. The deposition method according to any one of Claims 13 to 15, wherein a laser ablation process is used.